

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the present application.

Listing of Claims:

Claim 1 (currently amended): A gallium-nitride semiconductor substrate onto which a light-emitting-device-forming film has been epitaxially grown, characterized by photoluminescent emission from the device-forming film under a predetermined monochromatic beam correlating to a metal atom the gallium-nitride substrate therein contaminated on its epitaxial-film side by one or more of the metals Si, Cr, Mn, Fe, Ni, Cu, Zn and Al at a density level of from 15×10^{10} to 10×10^{11} atoms/cm² or less on the GaN substrate surface.

Claim 2 (currently amended): A gallium-nitride semiconductor substrate onto which a light-emitting-device-forming film has been epitaxially grown, characterized by photoluminescent emission from the device-forming film under a predetermined monochromatic beam correlating to a metal atom the gallium-nitride substrate therein contaminated on its epitaxial-film side by one or more of the metals Si, Cr, Mn, Fe, Ni, Cu, Zn and Al at a density level of from 15×10^{10} to 5×10^{11} atoms/cm² or less on the GaN substrate surface.

Claim 3 (withdrawn): A method of processing a gallium-nitride semiconductor substrate, the method comprising:

providing a gallium-nitride semiconductor substrate having a complex front side in which the Ga and N faces are exposed in alternation;

polishing the substrate front side with an abrasive embedded into a metallic platen, thereby transforming the substrate episurface into a process-transformed layer;

reactive-ion etching the substrate front side using a halogen plasma to remove the process-transformed layer; and

wet etching the reactive-ion etched substrate, by means of an etchant that is one of HF + H₂O₂, HCl + H₂O₂, H₂SO₄ + H₂O₂, HNO₃ + H₂O₂, HF + O₃, HCl + O₃, H₂SO₄ + O₃, HNO₃, or HNO₃ + O₃, and that has an oxidation-reduction potential of more than 1.2 V, in a room-temperature aqueous solution of pH = 2 to 3, thereby to remove contaminant metal produced by said reactive-ion etching.

Claim 4 (canceled)

Claim 5 (withdrawn): A method of processing a gallium-nitride semiconductor substrate as set forth in claim 3, characterized in that a wash for taking off organic matter by means of an organic solvent, and a wash by means of an alkaline solution in order to take off nonmetal contaminants are carried out either before or after the wet etching.

Claim 6-10 (canceled)

Claim 11 (new): A gallium-nitride semiconductor substrate as set forth in claim 1, wherein the substrate surface on which the epitaxial film has been grown is a complex of faces in which Ga is exposed, and faces in which N is exposed.

Claim 12 (new): A gallium-nitride semiconductor substrate as set forth in claim 2, wherein the substrate surface on which the epitaxial film has been grown is a complex of faces in which Ga is exposed, and faces in which N is exposed.